

REMARKS

Claims 1, 2 and 4-38 are now active in this application.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 103

I. Claims 1, 4, 6, 7, 11, 15, 16, 20, 25 and 26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. (U.S. Patent No. 6,157,072) in view of Takasaki et al. (U.S. Patent No. 4,980,736), Kobayashi et al. (U.S. Patent No. 6,476,867; hereinafter Kobayashi) and Sugawa (U.S. Patent No. 5,869,850).

II. Claims 2, 5, 17, 18, 23 and 24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. in view of Takasaki et al., Kobayashi et al. and Sugawa as applied to claims 1, 4, 6, 7, 25 and 26 and further in view of Deane et al. (U.S. Patent No. 6,064,091).

III. Claims 8-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. in view of Takasaki et al., Kobayashi et al. and Sugawa, as applied to claims 1 and 4 above, and further in view of Anagnostopoulos (U.S. Patent No. 5,563,404), Ota (U.S. Patent No. 4,496,981) and Waki et al. (JP 01-311511).

IV. Claim 12 is rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. in view of Takasaki et al., Kobayashi et al. and Sugawa, as applied to claim 4, and further in view of Fukuda et al. (U.S. Patent No. 5,635,327).

V. Claims 13, 14 and 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. in view of Takasaki et al., Kozuka et al. (JP 09-102627), and Kobayashi et al.

VI. Claims 21 and 22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. in view of Takasaki et al.

VII. Claims 27-30, 33, 37 and 38 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. in view of Takasaki et al., Kobayashi et al. and Sugawa, as applied to claims 1, 4, 6, 7, 16, 25 and 26 above, and further in view of Kodama et al. (USPN 5,122,431).

VIII. Claims 31, 32 and 34 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. in view of Takasaki et al., Kozuka et al. and Kobayashi et al., as applied to claims 13, 14 and 19 above, and further in view of Kodama et al.

IX. Claims 35 and 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama et al. in view of Takasaki et al., as applied to claims 21 and 22 above, and further in view of Kodama et al.

X. The rejection of claims 1, 2 and 4-38, listed above in sections **I-IX** are respectfully traversed.

As noted in the response dated April 18, 2003, the present invention generally relates to the layered structure of photoelectric conversion device. More specifically, as recited in the independent claims, the photoelectric conversion device essentially comprises I-a-Si layer sandwiched by p-a-SiC layer and n-a-SiN.

The Examiner relies upon Nakayama as showing a SiN layer, and refers to the paragraph at column 20, lines 34-46 of this reference, which describes:

In the practice of the present invention, *the semiconductor layer* is not limited to a PIN-type amorphous silicon semiconductor image sensor. Thus, it *may be any* of PIN, NIP, NI, PN, MIS, heterojunction, homojunction, Schottky-barrier and *mixed type sensors fabricated by using amorphous or microcrystalline silicon semiconductors which include*, among others, amorphous silicon a--Si, hydrogenated amorphous silicon a--Si:H, hydrogenated amorphous silicon carbide a--SiC:H, *amorphous silicon nitride*, etc., and alloys of silicon with carbon or any of germanium, tin and other metals. Aside from the above, the linear image sensor to which the invention is applicable includes those using other semiconductors such as GaAs, GdS and other types of semiconductors.

Clearly, in this paragraph, usable examples as the semiconductor, as a whole, are listed and a-SiN is merely introduced as one example therefor, but is NOT as an example for the specific layer of n-type a-SiN. Thus, there is no teaching in this reference regarding the specific combination of layers of p-type a-SiC, a-Si, and n-type a-SiN (the a-Si carrier generation/multiplication layer provided between the p-type a-SiC electron injection inhibiting layer and the n-type a-SiN hole injection inhibiting layer), as recited in the present claims. The Examiner has never responded to this argument.

As to Takahashi et al., Kobayash et al., Sugawa, Deaane et al., Anagnostophulos, Ota, Waki et al., Fukuda et al. and Kozuka et al., none of these references disclose or suggest the deficiency of Nakayama et al., identified above. Therefore, even if the teachings of Takahashi et al., Kobayash et al., Sugawa, Deaane et al., Anagnostophulos,

Ota, Waki et al., Fukuda et al. and Kozuka et al. were somehow combined with the disclosure of Nakayama et al., the claimed invention does not result.

As noted in the previous response also, regarding the Examiner using Sugawa as a prior art teaching of the claimed limitation regarding energy levels by referring to Figures 6 and 7 of this reference, Applicants point out once again that, contrary to the Examiners finding, Figures 6 and 7 do **NOT** teach the claimed limitation regarding energy levels. The Examiner has never responded to this argument.

As to Deane et al., this reference does not relate to photoelectric conversion device and does not disclose a sandwich structure. Therefore, this reference is not relevant to the claimed invention. The Examiner has never responded to this argument.

As to the rejection of claims 21 and 22 in section VI above, the Examiner admits that Nakayama et al. does not disclose the inhibiting layer on only a substrate. However, the Examiner maintains that Takasaki et al. further teaches the inhibiting layer (Fig. 1A, #15) on only a substrate (Fig. 1A, #16). Thus, the Examiner contends it would have been obvious to a person of ordinary skill in the art to have the inhibiting layer on only a substrate of Takasaki et al. with the device of Nakayama et al., since one would be motivated to place the inhibiting layer on something like a substrate for support, as implied from Fig. 1A of Takasaki et al.

In the previous response, Applicants noted that in Fig. 1A of Takasaki et al., blocking layer 15 is formed on electrode 16 which is formed on substrate 11. This is the same structural arrangement shown in Fig. 3 of Nakayama et al. Thus, modifying the device of Nakayama et al. in view of the teaching of Takasaki et al. results in the exactly

the same structural arrangement already disclosed in Nakayama et al. The Examiner has never responded to this argument.

Applicants wish to point out that each of Nakayama et al., Takahashi et al., Kobayash et al., Sugawa, Deaane et al., Anagnostophulos, Ota, Waki et al., Fukuda et al. and Kozuka et al., was applied by the Examiner, in Official Action of December 18, 2002, against exactly the same claims and in exactly the same manner as applied in the present Official Action. However, as noted above, the Examiner has not addressed the relevant argument concerning why Nakayama et al. does not disclosed the specific combination of layers of p-type a-Sic, a-Si, and n-type a-SiN, as recited in the present claims, as well as the relevant arguments with respect to others of the applied prior art references.

In this regard, the Examiner is reminded that M.P.E.P. § 707.07 (Completeness and Clarity of Examiner's Action) states that the Examiner must address any arguments presented by the applicant *which are still relevant to any references being applied*. This has not been done in the present Official Action. Thus, the Examiner has failed to comply with M.P.E.P. § 707.07, as the Examiner has not addressed the above noted relevant arguments concerning the applied references.

XI. In view of the above, claims 1, 2 and 4-38 are patentable over Nakayama et al., Takahashi et al., Kobayash et al., Sugawa, Deaane et al, Anagnostophulos, Ota, Waki et al., Fukuda et al. and Kozuka et al. and Kodama et al., considered alone or in combination. Therefore, the allowance of claims 1, 2 and 4-38 is respectfully solicited.

CONCLUSION

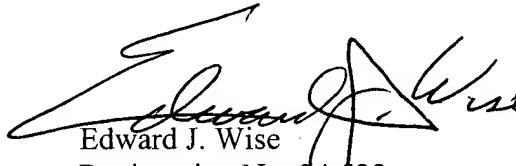
Accordingly, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

09/704,539

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Date: November 10, 2003